CLAIMS:

1. Apparatus comprising:

(a) a balloon having proximal and distal ends and a lengthwise direction between said ends, said balloon having an inflated condition and a deflated condition, said balloon having a deflated length between said ends in the deflated condition and an inflated length in the inflated condition, said inflated length being less than said deflated length; and

(b) a tube disposed within said balloon and extending in the lengthwise direction of said balloon, said tube having an interior bore at least partially defining a passageway through said balloon, said tube having a proximal end mechanically linked to the proximal end of the balloon and a distal end mechanically linked to the distal end of the balloon, whereby said tube is stretched in the lengthwise direction when said balloon is deflated and shortened in the lengthwise direction when said balloon is inflated, said interior bore of said tube having diametrical dimensions which remain substantially constant despite such stretching and compression.

2. Apparatus comprising:

(a) a balloon having proximal and distal ends and a lengthwise direction between said ends, said balloon having an inflated condition and a deflated condition, said balloon having a deflated length between said ends in the deflated condition and an inflated length in the inflated condition, said inflated length being less than said deflated length; and

(b) a tube disposed within said balloon and extending in the lengthwise direction of said balloon, said tube having an interior bore at least partially defining a passageway through said balloon, said tube having a proximal end mechanically linked to the proximal end of the balloon and a distal end mechanically linked to the distal end of the balloon, whereby said tube is stretched in the lengthwise

direction when said balloon is deflated and shortened in the lengthwise direction when said balloon is inflated, said tube being formed from a material selected from the group consisting of expanded polymers.

3. Apparatus as claimed in claim 2 wherein said tube is formed from an expanded polytetraflourethylene.

4. Apparatus as claimed in claim 1 or claim 2 wherein said bore of said tube has a first interior diameter when the balloon is deflated and the tube is shortened and a second interior diameter when the balloon is inflated and the tube is stretched, said first and second interior diameters differing from one another by less than about 20 percent of the first interior diameter.

5. Apparatus as claimed in claim 1 or claim 2 further comprising a carrier catheter mechanically linked to said proximal end of said balloon, said carrier catheter having a bore communicating with the bore of said tube.

6. Apparatus as claimed in claim 5 further comprising an elongated element extending through said carrier catheter and said bore and projecting beyond said distal end of said balloon.

7. Apparatus comprising:

(a) a balloon having proximal and distal ends and a lengthwise direction between said ends, said balloon having an inflated condition and a deflated condition, said balloon having a deflated length between said ends in the deflated condition and an inflated length in the inflated condition, said inflated length being less than said deflated length; and

(b) a plurality of engagement elements disposed at least partially within said balloon and movable with respect to one another in the lengthwise direction, said balloon urging said engagement elements into engagement with one another upon inflation of the balloon, said engagement

elements being movable away from one another in the lengthwise direction upon deflation of the balloon.

8. Apparatus as claimed in claim 7, wherein said plurality of engagement elements includes a first engagement element and a second engagement element, said second engagement element at least partially telescopically encompassing said first engagement element when said balloon is in said inflated condition.

9. Apparatus as claimed in claim 8, wherein said plurality of engagement elements includes a third engagement element, said third engagement element at least partially telescopically encompassing said second engagement element when said balloon is in said inflated condition.

10. Apparatus as claimed in claim 8, wherein said first engagement element defines an axis, said second engagement element defines an axis, said engagement elements are pivotable relative to one another so that the axis of the second engagement element can pivot relative to the axis of the first engagement element through a predetermined angular range when said balloon is in said deflated condition.

11. Apparatus as claimed in claim 10, wherein said second engagement element is substantially constrained against translational movement relative to said first engagement element in directions transverse to the axis of the first engagement element when said balloon is in said deflated condition.

12. Apparatus as claimed in claim 8, further comprising a stem projecting from said first engagement element, said stem being disposed inside said second engagement element when said balloon is in said deflated condition, at least a part of said stem having a smaller cross-sectional area than said first engagement element.

13. Apparatus as claimed in claim 12, wherein said first engagement element has a tapered surface leading into said stem.

14. Apparatus as claimed in claim 12, wherein said stem includes a bulbous tip remote from said first engagement element and a main portion connecting said bulbous tip to said first engagement portion, said bulbous tip being wider than said main portion, said bulbous tip being disposed inside said second engagement element when said balloon is in said deflated condition.

15. Apparatus as claimed in claim 14 wherein said bulbous tip defines a ball-joint surface in the form of a zone of a sphere, said ball-joint surface having a diameter.

16. Apparatus as claimed in claim 15 wherein said first engagement element and said stem cooperatively define a stem bore extending along the axis from the proximal end of said first engagement element to the distal end of said stem at said bulbous tip.

17. Apparatus as claimed in claim 13 wherein the end portion of said second engagement element can pivot about said bulbous tip.

18. Apparatus as claimed in claim 15 wherein said second engagement element has an interior bore, said interior bore having an internal diameter larger than the diameter of said ball-joint surface.

19. Apparatus as claimed in claim 18 wherein said internal diameter is about 25-100 microns larger than said diameter of said ball-joint surface.

20. Apparatus as claimed in claim 12, further comprising a spring disposed within said second engagement element, said spring urging said engagement elements and said ends of said balloon away from one another when said balloon is deflated.

21. Apparatus as claimed in claim 20, wherein said spring is compressed when said balloon is in said inflated state.

22. Apparatus as claimed in claim 15, further comprising a flexible tube within said second engagement element, wherein said flexible tube can flex when said balloon is in a deflated state.

23. Apparatus as claimed in claim 22 wherein said flexible material is substantially coaxial with said second engagement element.

24. Apparatus as claimed in claim 22, wherein said spring surrounds said flexible material.

25. Apparatus as claimed in claim 8 wherein said first engagement element has a outside diameter and said second engagement element has an interior bore which encompasses said first engagement element when said balloon is in said inflated condition, said interior bore having an internal diameter slightly larger than the outside diameter of said first engagement element so that said first and second engagement elements are constrained in substantially coaxial alignment with one another when said balloon is in said inflated condition.

26. Apparatus as claimed in claim 25 wherein said internal diameter of said interior bore in said second engagement element is about 25-100 microns larger than said outside diameter of said first engagement element.

27. Apparatus as claimed in claim 8, wherein an end portion of said second engagement element closest to said first engagement element includes a soft material to prevent said balloon from being damaged.

28. Apparatus as claimed in claim 26, wherein said second engagement element includes a substantially rigid tube and a sleeve of said soft material at said end portion of said

second engagement element closest to said first engagement element.

29. Apparatus as claimed in claim 8, wherein said first engagement element is located proximally to said second engagement element and said second engagement element is located distally from said first engagement element.

30. Apparatus as claimed in claim 8, wherein one engagement element completely telescopically encompasses another engagement element when said balloon is in said inflated condition.

31. Apparatus as claimed in claim 7 further comprising an axial member extending in the lengthwise direction within the balloon, said axial member at least partially constraining said engagement elements in radial directions transverse to said lengthwise direction.

32. Apparatus as claimed in claim 31 wherein said axial member has a proximal end mechanically linked to the proximal end of the balloon and a distal end mechanically linked to the distal end of the balloon.

33. Apparatus as claimed in claim 32 wherein said axial member includes a spring, said spring urging said ends of said balloon away from one another when said balloon is deflated.

34. Apparatus as claimed in claim 33 wherein said spring is a coil spring having an axis extending in the lengthwise direction.

35. Apparatus as claimed in claim 34 wherein at least one of said engagement elements is generally tubular and surrounds said coil spring.

36. Apparatus as claimed in claim 34 wherein said axial member further includes a tube coaxial with said coil spring and disposed within said coil spring, said tube defining an interior bore.

37. Apparatus as claimed in claim 36 further comprising a carrier catheter having a lumen, said proximal end of said

balloon being secured to said carrier catheter, said lumen communicating with said interior bore of said tube.

38. Apparatus as claimed in claim 37 wherein said lumen, said stem bore and said flexible tube communicate with one another to form a continuous channel within said carrier catheter.

39. Apparatus as claimed in claim 37 wherein said plurality of engagement elements include a stop secured to said carrier catheter within said balloon adjacent the proximal end thereof and a first mobile engagement element, said first mobile engagement element engaging said stop when said balloon is in said inflated condition.

40. Apparatus as claimed in claim 39 wherein said first mobile engagement element is movable in the lengthwise direction relative to said stop and said carrier catheter when said balloon is in said deflated condition.

41. Apparatus as claimed in claim 40 wherein said first mobile engagement element is mounted to the distal end of the balloon.

42. Apparatus as claimed in claim 40 wherein said engagement elements include a second mobile engagement element mounted to the distal end of the balloon and movable in the lengthwise direction relative to said first mobile engagement element and relative to said stop, said first mobile engagement element being disposed between said second mobile engagement element and said stop.

43. Apparatus as claimed in claim 39 further comprising an ultrasonic transducer mounted to said carrier catheter within said balloon and between the proximal end of the balloon and said stop.

44. A method of placing and operating a device comprising:

(a) threading a carrier catheter into the body of a mammalian subject while a balloon secured to the carrier

catheter is in a deflated condition and while engagement elements disposed at least partially within the balloon are disengaged from one another; then

(b) inflating the balloon so that the balloon expands in radial directions and contracts in a lengthwise direction, and so that contraction of the balloon moves the engagement elements into proximity with one another;

(c) performing a procedure using the balloon in its inflated condition, said engagement elements reinforcing the balloon during said procedure; and then

(d) deflating the balloon so that said engagement elements disengage from one another and withdrawing the carrier catheter and balloon while said engagement elements are disengaged from one another.

45. A method as claimed in claim 44 further comprising the step of urging a distal end of the balloon away from a proximal end of the balloon in a lengthwise direction during said deflating step.

46. A method as claimed in claim 45 wherein adjacent ones of said engagement elements are telescopically engaged in one another when said balloon is inflated condition, and wherein said engagement elements are constrained in coaxial alignment with one another when said balloon is inflated.

47. A method as claimed in claim 46 wherein said balloon has proximal and distal ends, one of said engagement elements being connected to the proximal end of the balloon, another one of said engagement elements being connected to the distal end of the balloon, said engagement elements holding said proximal and distal ends of the balloon in alignment with one another when the balloon is inflated.

48. A method as claimed in claim 45 wherein a stem projecting from a first one of said engagement elements is disposed within a second one of said engagement elements when said balloon is in said deflated condition during said

threading step, said stem allowing said second engagement to pivot relative to said first engagement element during said threading step.

49. A method as claimed in claim 48 wherein said stem projecting from said first engagement element remains disposed within said second engagement element during said deflating and withdrawing step.

50. A method as claimed in claim 45 wherein said step of urging the distal end of the balloon is performed by a spring disposed within the balloon.

51. A method as claimed in claim 50 wherein said spring twists the distal end of the balloon relative to the proximal end during the deflating step.

52. A method as claimed in claim 45 further comprising the step of providing a guide element extending through the carrier catheter, extending through a tube disposed within the balloon and extending beyond the balloon, stretching the tube upon movement of the distal end of the balloon away from the proximal end and foreshortening the tube upon inflation of the balloon.

53. A method as claimed in claim 44 wherein said step of performing a procedure includes directing energy from a transducer disposed within the balloon to a wall of the balloon and reflecting the energy towards a target region of the subject at the wall of the balloon.